

8/3/2006 Response to Office Action
U.S.S.N. 10/807,944

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REMARKS

The present invention relates to an improved chemical-mechanical polishing (CMP) slurry composition. Claims 1-16 are currently pending.

Claims 1-16 are rejected under U.S.C. 35 103(a) as allegedly being unpatentable over Small *et al.* (US 2003/0162398) in view of Sethuraman *et al.* (US 5,972,124). The Office Action states that Small *et al.* teaches an aqueous composition for CMP and a broad selection of abrasives including alumina, fumed alumina, and titania. The Office Action further states that Small *et al.* teaches metal abrasive particles, which are catalysts, use of metal ions as catalysts, and a slurry comprising water having a pH of about 2-11. The Office Action points out that Small *et al.* fails to use the units of mmol/kg of ions as defined in applicant's claims 1, 2, 3, and 10. The Office Action states that it would have been obvious to one of ordinary skill in the art at the time of the invention to convert weight percentage into molarity, and that the conversion of the amounts disclosed by Small *et al.* would overlap the claimed concentrations.

Applicants respectfully disagree. Small *et al.* teaches a composition for chemical mechanical polishing comprising abrasives having a surface at least partially coated by a metal catalyst. Small *et al.* teaches that the catalyst is absorbed onto at least a portion of the surface of the abrasive particle (see for example, paragraphs [0028] and [0044]). The Small reference teaches that the metal catalyst is absorbed on the surface of the abrasive for stability purposes; demonstrating that when the metal catalyst is dissolved in the aqueous solution it reacts very rapidly with the oxidizer, and hence, destroying the stated purpose (see for example paragraphs [0059] through [0062]). Small also teaches that there is an interaction between the metal catalyst absorbed on the surface of the abrasive, and the oxidizing agent in solution, and asserts that the reaction takes place at the surface of the catalyst. Small *et al.* assert that this reaction is believed to generate free radicals or active reaction intermediates, such as free hydroxyl radicals, at the catalyst surface, which favorably interact with the targeted material on the substrate when the catalyst coating on the abrasive contacts the substrate surface. Small *et al.* state that the catalyst is preferably "substantially insoluble in the composition such that it remains for the most part on the abrasive particle during the CMP process" (see paragraph [0026]). The metal catalyst compounds of Small *et al.* are clearly a solid coating on an abrasive particle and not dissociated ions in the liquid.

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The Office Action has cited the Solubility Rules for Ionic Solids in Water (Office Action page 3). However, the metal catalysts of the Small reference are not ionic solids in water, they are absorbed to an insoluble metal oxide abrasive to prevent them from dissolving (see paragraph [0028]). Therefore, although applicants agree that some of the compounds taught by Small *et al.* can dissociate into ions if they were dissolved in water, the metal catalyst compounds of Small are purposely absorbed onto an abrasive particle to prevent that from happening. Small *et al.* very clearly teaches away from having metal ions in the composition because metal ions would destroy the intended function of the Small reference; creating a reactive surface on the abrasive particle.

Furthermore, applicants assert that Small *et al.* offer no quantitative parameter for the catalyst. The only quantitative parameter given by Small *et al.* is that the catalyst at least partially coats an abrasive and that the abrasive plus catalyst is present at about 0.5wt %. No actual amount of the catalyst is taught, only the weight percent of the abrasive particle plus the absorbed catalyst. Small *et al.* also teach that the catalyst may coat from about 5 to about 100 percent of the surface of the abrasive particle (see paragraph [0028]), and that the abrasive particle is "more or less spherical and has an effective diameter of about 30 to about 170 nanometers," but gives no guidance to the surface area of the particle or the thickness of the coating. Applicants respectfully disagree with the assertion of the Office Action that Small *et al.* would overlap applicants' claimed concentration upon a unit conversion from wt%, because Small *et al.* does not teach the wt% of the metal catalyst.

For at least these reasons, Small *et al.* is not anticipatory to the applicants' limitation of a metal ion or to concentrations thereof. Small *et al.*, therefore, cannot be properly combined with any other reference to form a *prima facie* obviousness argument.


Entry of the above remarks and reconsideration is respectfully requested under 37 CFR §1.116. Applicants respectfully request that the rejections under U.S.C. 35 §103(a) be withdrawn. The applicants believe that the application is in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned agent.

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Respectfully submitted,

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